

## NOTES ON THE FISHES OF PUGET SOUND.

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The following notes are based on collections made at various localities in Puget Sound during the summer of 1903 by Prof. Trevor Kincaid, of the University of Washington, and Dr. J. C. Thompson, U. S. Navy, and on a further collection made by Professor Kincaid during the summer of 1904. The specimens were secured along shore or by dredging in shallow water. The majority of the species were well-known and are not here listed, but in addition to these the collection contains two undescribed species and six which have not been reported hitherto from Puget Sound. Of the latter, two species have been known only from Alaskan waters, one from the coast of Oregon, two from California, and one from the Gulf of California. That such notable extensions of range can be made on limited collecting indicates that we are still far from an adequate knowledge of the distribution of the fishes of the Pacific coast.

The authors desire to acknowledge their indebtedness to Professor Kincaid for submitting to them this material.

### ENTOSPHEMUS TRIDENTATUS (Gairdner).

A male specimen, 350 mm. long, taken in Lake Washington, near Seattle, differs widely from current descriptions of *E. tridentatus*. The differences may be sexual, and the ordinary male form may have been overlooked hitherto. Among the collections of Stanford University is a male specimen from the Rogue River, Oregon, which agrees in almost all details with the Seattle specimen here described. Other specimens before us exhibit the usual conditions and are all females or doubtful as to sex, and the material is too scanty to permit a determination of the question.

The principal differences from the previously recognized form of *tridentatus* are the posterior origin of the first dorsal, the absence of any interval between the two dorsal fins, and the greater height of the fins; there is also a distinct precaudal fold which extends forward to the vent. The head is also longer, the eye larger, and the tail shorter.

The arrangement of the teeth is wholly similar to that in ordinary *tridentatus*. The supra-oral plate contains two large lateral and a small median cusp, the latter distinct, but less than half the length of the lateral cusps. The infra-oral plate is crescentic, with five equally spaced broadly triangular cusps. There are about three series of very small simple teeth on the disk in front of the pre-oral plate, the median tooth larger than the others. Behind the infra-oral lamina are two series, one near the margin, the other halfway between the margin and the infra-oral lamina. The inner series consists of 16 small teeth, each inserted at the inner end of a short radial furrow. The anterior tooth on each side is bicuspid, all the others simple. The lateral portion of the disk contains on each side four larger plates, the anterior and posterior of which are bicuspid, the others tricuspoid. The anterior lingual plate has a straight transverse margin, very finely pectinate. The margin of the disk is densely fringed.

The eye is large, its diameter equaling half the interorbital width.

The front of the dorsal is behind the middle of the total length. Its greatest height is two-fifths the length of the fin behind its origin. Posteriorly, it joins the base of the second dorsal, being abruptly notched at point of union. The second dorsal is very high, its longest rays, including muscular area at base, one-fourth the length of the base. A vertical line from the vent traverses the second dorsal at the end of its first fourth. In advance of the lower half of the caudal fin a well-defined rayless fold of the integument extends forward to the vent, increasing in height anteriorly and ending in a rounded lobe.

In spirits, the color is slaty-brown, the posterior part of the first dorsal and the anterior end of the anal fold white. The caudal fin is largely black. The lips and gullet are slaty, the buccal disk whitish.

*Measurements in hundredths of total length.*

	Lake Washing- ton.	Rogue River.	Klamath River.	Rogue River.	Rogue River.
	<i>Male.</i>	<i>Male.</i>	<i>Female.</i>	<i>Female.</i>	<i>Sex?</i>
Total length (in millimeters) .....	350	425	263	535	580
Length of snout .....	8.9	9	8	7.2	7.1
Length of head to first gill slit .....	14	14.5	11.5	11.4	11
Distance between first and last gill slits .....	10.8	11	9.5	10.2	10.5
Diameter of eye .....	2.3	2.3	1.9	1.4	1.5
Length before dorsal .....	54	51.5	50	49	46.5
Base of first dorsal .....	16	15.5	14	15	17
Interspace between dorsals .....	0	0	5.2	5	5
Height of first dorsal .....	2.6	4.3	.....	2.5	2.3
Base of second dorsal .....	23.3	26.5	24.5	25	24
Length of caudal from upper notch .....	6.5	8	7	7	7.3
Distance from vent to tip of tail .....	25	26	29.3	29.5	29.2

## CATULUS BRUNNEUS Gilbert.

A single specimen of this species, known hitherto only from the type which was captured in deep water in the Gulf of California, was taken by Doctor Thompson, at Brinnon, Hood's Canal, Puget Sound. It has been compared directly with the type specimen and found to agree with it closely.

Specimen a female, 42 cm. long.

Body narrow, elongate, compressed, the vent in the middle of the total length. Head slender, with comparatively long pointed snout, strongly resembling the long-snouted species of *Mustelus*. The pre-orbal length of the snout slightly exceeds the distance between outer edges of nostrils and equals the interorbital width. The greatest width of the snout slightly exceeds its length before orbits. Anterior nasal valve with a narrowly rounded lobe, the width of which exceeds its length; isthmus between nostrils equaling or slightly exceeding the length of the nostril; labial folds well developed, the upper slightly the longer, the lower one-third or two-fifths the distance from outer labial angle to symphysis.

The teeth bear each a moderate, nearly straight, central cusp, and a pair of small but obvious lateral cusps. Borne on the extreme base of each lateral cusp is a minute denticle, which is usually wholly concealed.

The eyes are small, one-third the width of the mouth between outer labial angles, the small spiracles separated from them by less than one-third their diameter.

The head is very soft and spongy. The snout bears a flask-shaped patch of coarse pores on the middle line above and an elliptical patch below. Other conspicuous patches are one below the front of the eye, one behind the nostril, one behind the spiracle, a pair on interorbital space, and a series running backward and outward from near angle of mouth.

The pectoral is short, with broadly rounded angles; the length of its anterior margin equals its distance from orbit. The base of the anterior dorsal extends a little behind the line of attachment of the ventrals; the anterior fin is smaller than the posterior, the length of its base about three-fifths the distance between dorsals. The length of the anal base is twice that of the second dorsal and extends very slightly behind it. The caudal bears a sharp notch below its terminal lobe, which is about one-sixth its length.

The skin is everywhere covered with minute, closely appressed, triangular scales, each bearing a median cusp and a pair of diverging lateral cusps. All the fins are wholly invested with similar scales. No enlarged plates along back of tail.

Color in spirits: Top of head and a streak along middle of back in front of first dorsal, warm brown; sides of head and body and the fins slate-color; under parts slaty, a light-gray streak extending forward from each ventral base nearly half way to pectorals. All the fins are narrowly black-edged anteriorly. The color may have been uniform brownish in life.

*Measurements in hundredths of total length.*

	Brinnon, Wash.	Type, Gulf of California.
Greatest depth.....	14.5	14
Length of head, to anterior gill-slit.....	19.5	19
Longitudinal diameter of orbit.....	3	3
Interorbital width.....	8	7.5
Preocular length of snout.....	9.5	9.5
Preoral length of snout.....	8	7.5
Width of head behind spiracles.....	11	11
Greatest width of snout.....	11	10
Width between outer labial angles.....	9.5	9
Length of fold of upper lip.....	3	3.5
Length of fold of lower lip.....	2.5	3
Distance between inner ends of nostrils.....	3.3	3
Distance from snout to pectoral base.....	23	24
Length of anterior margin of pectoral.....	10.5	10.5
Length of interval between pectorals and ventrals.....	18	17
Base of first dorsal, including anterior fold.....	7	6.5
Distance between dorsals.....	8	7.5
Length of base of second dorsal.....	6	6
Length of anal base.....	13	12.5
Length of caudal, measured below.....	30	28
Distance from outer labial angle to symphysis.....	5.5	6
Total length (in millimeters).....	420	485

TARANDICHTHYS FILAMENTOSUS (Gilbert).

A perfectly typical specimen, 98 mm. long, from Hood's Canal. The species was originally described from the Santa Barbara channel, and has been known hitherto only from southern and central California.<sup>a</sup> Current descriptions should be corrected in two respects: (1) The interorbital area is comparatively wide, shallowly grooved, the width increasing with age, but the maximum width is only about two-thirds the diameter of the pupil, not, as described, more than half the diameter of the orbit. (2) The two anterior filamentous dorsal spines are produced far beyond the fin-membranes, the latter connecting their basal portions and joining them to the third spine at a level corresponding to the tips of the third and some of the succeeding spines.

ICELINUS BOREALIS Gilbert.

*IceLinus strabo* STARKS, Proc. Cal. Acad. Sci., 2d ser., VI, 1896, p. 551.

Three specimens, the largest 70 mm. long, were dredged by Professor Kincaid in Griffin Bay, East Sound and West Sound. Reexamination of the types of *I. strabo* show that they are within the range

<sup>a</sup>Gilbert, Rept. Comr. Fish and Fisheries for 1893 (1896), p. 469.

of variation of *I. borealis* and belong with that species. The statement introduced by Jordan and Evermann into the key to species of *Icelinus*,<sup>a</sup> denying the presence of a nasal tentacle in *I. strabo*, is an error. A simple nasal tentacle is present in the types of *I. strabo*, wholly similar to that found in typical *borealis*.

**ASTROLYTES FENESTRALIS** (Jordan and Gilbert).

*Artedius asperulus* STARKS, Proc. Cal. Acad. Sci., 2d ser., VI, 1896, p. 553.

No specimen of this common species was included in the submitted material. It is mentioned here to place on record the fact that the immature types of *Artedius asperulus* are members of this species. In the young of *Astrolytes*, the lowermost of the three prongs of the preopercular spine is still undeveloped at a time when the upper two prongs are strong and equally developed. The third or lower prong makes its appearance first as a small, flattened prominence on the lower side of the middle prong near its base. We find it undeveloped on one side, but evident on the other, in a specimen of *A. fenestralis* nearly twice the size of the types of *A. asperulus*. In one of the latter it is apparent on one side, though minute. In all the types, the occiput is partly covered with spinous plates and bears a number of filaments. We have compared the types directly with *A. fenestralis* and find them to agree in all respects.

The genus *Axyrius* Starks<sup>b</sup> is scarcely distinct from *Astrolytes*, with which it agrees in all characters except the slenderness of the preopercular spine. In the type of *Axyrius harringtoni*, a short prominence is found on the lower side of the lower prong, agreeing in position with the third prong in *Astrolytes fenestralis*.

**STELGIDONOTUS**, new genus (Cottidæ).

Allied to *Rastrinus*; differing in the cuboid head, with its wide inter-orbital space, vertical cheeks, blunt snout, and broad U-shaped subinferior mouth, in the absence of plates or spines on the head, and in the simple, strong, falcate preopercular spine.

*Type*.—*Stelgidonotus latifrons*, new species.

**STELGIDONOTUS LATIFRONS**, new species.

Type 24 mm. long, from Friday Harbor, Washington, collected by Prof. Trevor Kincaid. Cat. No. 53027, U.S.N.M.

Dorsal IX, 19; anal 15; pectoral 13; ventral I, 3; tubes in lateral line 39.

Body slender, terete, tapering to the very slender caudal peduncle. Head with vertical cheeks, its height and width equal. Occiput gently

<sup>a</sup>Fishes of North and Middle America, p. 1894.

<sup>b</sup>Proc. Cal. Acad. Sci., 2d ser., VI, 1896, p. 554.

convex transversely; the broad interorbital space with a shallow lengthwise groove. Snout short and bluntly rounded, its sides vertical. Nasal spines strong. Width of preorbital 2.1 times in orbit. Mouth horizontal, broadly U-shaped, at lower side of snout, the mandible included. Maxillary reaching vertical from middle of orbit. Well-developed bands of teeth in jaws and on vomer and palatines. Top of head smooth, without plates, ridges, spines, or dermal flaps. Upper preopercular spine simple, strong, falcate, its length two-thirds the diameter of the eye; three blunt prominences below it. Opercle with a strong horizontal rib, but without spine. Eyes circular, without vertical range. Gill membranes united across throat, forming a wide, free fold. No slit or pore behind fourth gill arch. Head with series of very large mucous pores.

Back and sides thickly invested with small plates, each bearing a depressed spine. The spinous area includes the nape, and the back and sides of the caudal peduncle. A narrow strip along base of anal is naked, as are also the lower side of caudal peduncle, the entire head,

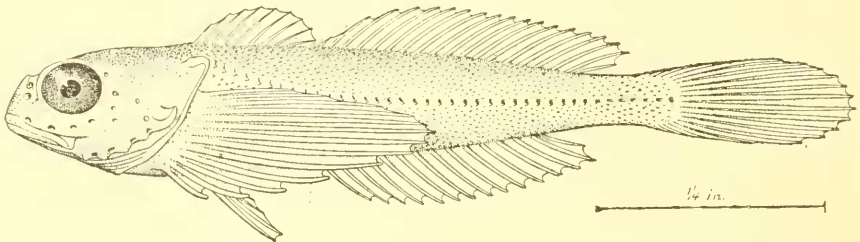


FIG. 1.—*STELGIDONOTUS LATIFRONS*.

breast, and abdomen, and the postaxial area. There are no enlarged plates or spines. The plates of the lateral line are very thin and inconspicuous; each pore is armed with a pair of minute diverging prickles.

Anterior dorsal low, continuous, gently rounded, of slender spines, wholly distinct from the second dorsal. Anal similar to second dorsal, beginning slightly in advance of dorsal and ending well in advance of last dorsal ray. Vent immediately in front of first anal ray. Pectorals very long and slender, the middle rays longest, reaching base of sixth or seventh ray of second dorsal. Ventrals reaching vent.

In spirits light gray, the upper parts coarsely punctate with black. Faint dark bars cross the back, two under spinous dorsal, three under soft dorsal, one on back of caudal peduncle. On the posterior half of sides, just below the lateral line, a series of small, round light spots are surrounded by incursions of the darker color of the back. Fins translucent. According to Professor Kincaid, the specimen was bright green in life.



Measurements in hundredths of length to base of caudal.

Length of head.....	32
Width of head.....	20
Interocular width.....	10
Length of snout.....	8
Width of snout.....	10
Diameter of eye.....	10
Length of maxillary.....	13
Width of mouth.....	12
Tip of snout to first dorsal spine.....	30
First dorsal spine to front of second dorsal.....	23
Base of second dorsal.....	37
Base of anal.....	35
Length of pectoral.....	38
Length of ventral.....	18
Length of caudal.....	25
Length of caudal peduncle from last anal ray.....	12
Length to base of caudal (in millimeters).....	19

MALACOCOTTUS KINCAIDI, new species.

Type 67 mm. long, from Brinnon, Hood's Canal, Washington; collected by Prof. Trevor Kincaid. Cat. No. 53028, U.S.N.M.

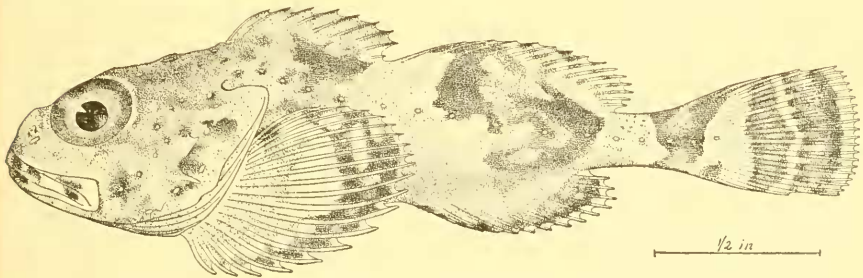


FIG. 2.—MALACOCOTTUS KINCAIDI.

Similar to *Malacocottus zonurus*, differing in the less robust form, the shorter head, the reduction or obsolescence of the cirri on the head, and the absence of the accessory spine which in *M. zonurus* projects laterally at right angles to the cheek, from the base of the middle preopercular spine. In structure of fins and in color the two species are very similar.

Dorsals IX-14; anal 11, the last ray divided to the base; ventral 1, 3; pectoral 21.

Length of head 40 hundredths of total length to base of caudal; eye 13; interorbital width 5.5; length of snout 11; maxillary 18; depth of body 27; depth of caudal peduncle 7; length of caudal peduncle 17; length of pectoral 29; length of caudal 27; length of ventrals 14; length of longest soft dorsal ray 22.

Head large, with nearly vertical cheeks, and a gently arched upper profile. The mouth is somewhat oblique, the maxillary extending nearly to the vertical from the posterior margin of the pupil. A pair of low occipital protuberances are present, less developed than in *M. zomurus*. The interorbital space is gently concave; it bears posteriorly a pair of ridges which join the supraorbital rim anteriorly, and converge toward the occiput but do not meet. No nasal spines are present. The posterior margin of the anterior nostril bears a short flap. The preopercle bears two slender diverging spines at the angle, the lower without trace of the accessory spinelet so conspicuous in *M. zomurus*; below and in front of the two diverging spines is a third directed downwards and forwards. The opercle is marked with two strong ribs, the upper of which is broad and longitudinally striate, but the ribs do not terminate in spines.

The jaws contain narrow bands of villiform teeth; the vomer and palatines are toothless. The gill membranes are broadly attached to the throat, and have the posterior margin wholly adnate. The appendages to the branchial arches are tubercular and spinous, similar on all the arches, those on the anterior limb nine in number. The fourth arch bears but a single row of filaments, and is without posterior pore or slit. A free fold of membrane, with marginal papillae, is attached to the inner face of the ceratohyal, and serves obviously as a valve to close the cleft in front of the first gill arch. The pseudobranchiae are large.

The dorsal fins are contiguous, the anterior low, with weak flexible spines. The second dorsal is longer than the anal, overpassing it both anteriorly and posteriorly. The pectorals have a broad procurrent base, the lower rays rapidly shortened. The ventrals are short, their length about equaling the diameter of the orbit, their basal half included within the integument of the abdomen.

Series of large mucous pores on the top and sides of the head; those along the course of the lateral line 15 in number.

Two pairs of blackish cross-blotches on the lips, the anterior much the larger. Head inconspicuously blotched and spotted with dusky. Three irregular dark cross-bars on the back, one under spinous dorsal, a broad well-marked bar below second dorsal, and a narrower one on the caudal peduncle and the basal portion of the caudal fin. The bars are more or less broken up by streaks or mottlings of the lighter brown color. The abdomen has a bluish or purplish tinge, and is punctate with black. The pectorals are dusky on the basal third, sometimes mottled, a light bar sometimes occupying the middle third of all except the lower rays; the terminal third is blackish, all except a few of the uppermost rays with whitish tips. The ventrals are dusky with whitish tips. The spinous dorsal is blackish, the soft dorsal with three or four oblique blackish bars, the anterior bar usually much wider than the



others. The anal is obscurely marked with oblique narrow cross-bars. The basal dark bar of the caudal is continued backwards on the upper and the lower rays, and serves partly to inclose the broad white bar which follows. The distal half of the fin is marked with one or two dark bars, and has a narrow white margin.

Numerous specimens have been examined. The species is evidently abundant in Puget Sound, where it is easily dredged in shallow water. The species is named for Prof. Trevor Kincaid, who is so energetically increasing our knowledge of the zoology of Puget Sound.

#### GILBERTIDIA SIGOLUTES (Jordan and Starks).

A second specimen of this interesting species, 68 mm. long, was dredged by Professor Kincaid in East Sound, in August, 1904. We have compared it directly with the diminutive type of the species without discovering important differences. The mouth seems less oblique and the mandible less prominent, but this may be due to a slight distortion in the type. We have examined it in connection also with specimens of *Psychrolutes parutoceus*, with a view to determining the value of the characters alleged to separate *Gilbertidia* and *Psychrolutes*. The distinctive characters of *Gilbertidia*<sup>a</sup> are said to be: (1) the very long continuous dorsal and anal fins; (2) the condition of the anterior rays of the dorsal, which are not concealed beneath the integument of the back; (3) the form of the mouth. *Psychrolutes* was originally described as having no spinous dorsal, but Jordan and Evermann say that the spinous dorsal consists of "short, slender, flexible spines, entirely embedded in the skin and not visible without dissection, as the spines do not rise above the level of the muscles." Again they say: "Dorsals united, with a slight notch between, the first buried in a ridge of skin so that its delicate spines can not be counted from without." Reexamination of *Psychrolutes* has shown that the above statements do not adequately represent the facts. There is usually no external trace of the spinous dorsal, the thick skin passing smoothly over the middorsal line without fold or attachment. On removing the integument, the spinous dorsal is found to consist of well-developed slender spines, lying loosely in the subcutaneous tissue, and joined together by membrane in the usual manner. They are movably articulated at the base, and are not at all embedded in the muscular tissue. They slightly increase in length posteriorly, and join the soft dorsal without notch. The spines are 10 to 12 in number, the soft rays 12 to 14; the first spine is inserted over the opercular flap.

It is evident therefore that in length and shape the dorsal fin in *Psychrolutes* does not differ from that in *Gilbertidia*, the only differ-

<sup>a</sup> *Gilbertina* (preoccupied) Jordan and Starks, Proc. Cal. Acad. Sci., (2), V, 1895, pp. 811, 812. Jordan and Evermann, Fishes of North and Middle America, Pt. 2, p. 2027.

ence of importance consisting in the concealment of the spinous dorsal in *Psychrolutes*. A minor difference is found in the backward extension of the vertical fins in *Gilbertidia*, the dorsal and anal being separated from the caudal only by a notch, leaving none of the caudal peduncle free. Because of the condition of the type of *G. sigolutes*, this character could not be determined and is incorrectly represented in the figure of the type. In the larger specimen before us, the upper profile of the anterior part of the head is less concave than is represented in the type drawing, the snout is more bluntly rounded, the mouth is less oblique, and the maxillary scarcely extends beyond the vertical from the middle of the eye. The shape of the head does not differ essentially from that of *Psychrolutes paradoxus*. In *Gilbertidia*, however, the fold of the lower jaw is continuous across the symphyseal region, while in *Psychrolutes* it is broadly interrupted in the middle line by a frenum. The spine described on the anterior end of the preorbital and that on the upper part of the shoulder girdle are not externally apparent in this larger example. The fin rays and proportions are as follows:

Dorsal VIII, 16; anal, 13; pectoral, 16.

Total length.....	millimeters..	68
Length to base of caudal.....	do.....	56
Length of head.....	hundredths..	39
Greatest depth.....	do.....	26
Depth of caudal peduncle.....	do.....	7
Greatest width of head.....	do.....	28
Length of snout.....	do.....	12
Diameter of eye.....	do.....	7
Interocular width.....	do.....	14
Length of maxillary.....	do.....	17
Snout to first dorsal spine.....	do.....	37
Length of pectoral.....	do.....	35
Length of ventrals.....	do.....	17
Length of caudal.....	do.....	23

#### XENERETMUS INFRASPINATUS Gilbert.

One specimen of this well-marked species, 98 mm. long, was dredged by Professor Kincaid in East Sound, July, 1904. The only specimens hitherto known were the type and cotype taken by the U. S. Bureau of Fisheries steamer *Albatross* off Cape Flattery at a depth of 77 fathoms.<sup>a</sup> The specimen here listed agrees with the type in fin-formulae and measurements and in all the distinctive characters of the species. The following corrections should be made in the original description, and apply as well to the type as to this specimen. The least interorbital width equals three-fourths the diameter of the orbit. The rostral plate contains six instead of five spines, as follows: three short spines on its upper surface, directed upwards and backwards; one

<sup>a</sup> Gilbert, Proc. Cal. Acad. Sci., 3d ser., III, 1904, p. 262, pl. xxvii.

strong spine at each outer angle, directed outwards and backwards; one very small spine between the two last mentioned, directed forwards from the median line. This median spine is not found in any other known species. There are faint, darker (not lighter) bars on back and sides.

Still a fourth specimen, a female, is in the collection of Stanford University, taken by the U. S. Bureau of Fisheries steamer *Albatross* at station 3259, in Bering Sea, depth 41 fathoms. The head and body are very much wider than in the specimens noted above, which are all males. The spines are shorter and blunter, the eye smaller, the ventrals shorter, and the lower pectoral rays are not produced beyond the outline of the fin. These are all sexual characters, parallel differences being found between the sexes in other species. The fin-rays are dorsal V-5, anal 8.

#### LIPARIS DENNYI Jordan and Starks.

Numerous specimens were dredged by Professor Kincaid in East Sound, Friday Harbor, and Upright Channel, Washington, in July and August, 1904.

The species is very close to *L. fucensis*, agreeing in size of disk and in the very wide gill-cleft. *L. dennyi* is more robust in form, with longer dorsal and anal fins, and these more extensively connate with the caudal fin. The two species form an evident transition to *Neoliparis*. In *L. dennyi* the first five to seven dorsal rays are unjointed, slender, and spine-like, but they usually increase in length regularly from the first and can not be distinguished from the articulated rays except by dissection. In the adult type of the species, the first twelve rays are unjointed, indicating apparently that this condition invades the fin with increasing age. Both dorsal and anal join the caudal for almost the entire height of the fins, with little or no notch, the basal third or two-fifths of the caudal being thus adnate with the anal. The dorsal contains in all 38 to 40 rays.

In *L. fucensis* the first five dorsal rays are slender and unjointed. They sometimes pass imperceptibly into the rayed portion of the fin, but more often form an anterior lower lobe, separated by a shallow notch from the rest of the fin, the middle spines a little higher than the anterior and posterior. Both dorsal and anal terminate in rounded posterior lobes, and are either wholly free from the caudal or join the latter only at its extreme base. The dorsal contains in all 35 or 36 rays. *Neoliparis fissuratus* Starks<sup>a</sup> is a synonym of *L. fucensis*. The genus *Neoliparis* apparently should be withdrawn.

In the type of *L. dennyi*, the diameter of the disk is contained  $1\frac{1}{3}$  times in its distance from tip of mandible,  $1\frac{1}{2}$  times in its distance from front of anal. The vent is very slightly nearer the front of the

<sup>a</sup>Proc. Cal. Acad. Sci., 2d ser., VI, 1896, p. 560.

anal than the posterior margin of the disk. In younger individuals the vent is more posteriorly placed, its distance from front of anal varying from one-third to two-thirds the distance to edge of disk, according to the size of the specimen. The teeth seem to be uniformly in 13 or 14 series in each half of either jaw.

Four different types of coloration are found among the new material: (1) Nearly plain brown with obscure dusky mottlings, the pectoral finely cross-barred with black and white. (2) The entire upper parts, including the dorsal fin, marked with parallel wavy light streaks with darker margins, the intervals between the streaks dusky olive; pectoral more obscurely barred. (3) Entire upper parts dark olive, thickly covered with small, white spots less than the diameter of the pupil. (4) Lighter olive, marked with few whitish or silvery white narrow streaks or bars, which are black margined. One series of these cross the dorsal fin, another the anal, both continued a variable distance on the body. Other streaks or spots occupy the top and sides of the head and may be symmetrically disposed on the two sides of the same individual, although not agreeing in different specimens. An approach to this type is found in one specimen in which the brown of the sides is divided by coarsely reticulating light lines, some of which run out on the bases of the fins.

#### PLECTOBRANCHUS EVIDES Gilbert.

The present collection contains a fine specimen of this species, 129 mm. long, from Hood's Canal; the second to be placed on record. The type was dredged by the U. S. Bureau of Fisheries steamer *Albatross* in shallow water off the coast of Oregon.

The pair of canines in the front of the premaxillaries are less marked than the type description would indicate, being evident, but not much larger than the remaining teeth of the outer series. The mandibular teeth form anteriorly a moderate band which tapers behind, but is not reduced to a single (irregular) series much in advance of the corner of the mouth. No anterior canines are visible on the mandible in this specimen.

No pores are evident in the lateral line, but its course is indicated by a series of widely spaced whitish bodies, much less numerous than the scales.

The nostril opens in a short tube with thin walls, collapsing in preserved specimens, and resembling then a simple flap.

The dorsal contains 55 spines; the anal 2 spines and 35 rays; the pectoral 15 rays.

#### *Measurements in hundredths of length, without caudal.*

Length of head.....	21
Length of snout.....	5
Diameter of eye.....	5.5

Length of maxillary .....	7
Depth of body .....	11
Depth of caudal peduncle .....	4.5
Distance from snout to dorsal .....	17
Length of longest dorsal spine .....	5
Distance from snout to anal .....	48
Length of second anal spine .....	3
Length of caudal .....	11.5
Length of longest pectoral ray .....	12.5
Length of ventral .....	8

*Plectobranchus* is most nearly allied to *Leptoclinus*, agreeing with the latter in the nonprotractile premaxillaries, the development of a pair of anterior canines in each jaw, and the elongation of the lower

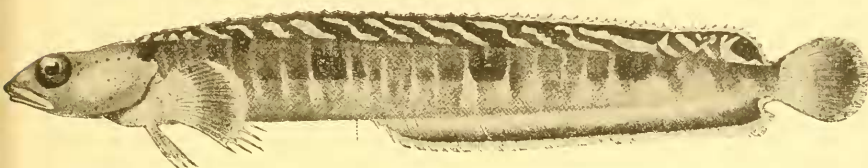


FIG. 3.—PLECTOBRANCHUS EVIDES.

pectoral rays. *Poroclinus* also has the upper jaw nonprotractile, while in *Leptoblennius* and *Lumpenus* a post-labial fold is well developed.

**BROSMOPHYCIS MARGINATUS (Ayes).**

A specimen 177 mm. long, from Puget Sound, gives a notable extension of the range of this rare species, known hitherto only from the vicinity of San Francisco.

The dorsal contains 108 rays, the anal 75. In a specimen from San Francisco, described by Jordan and Evermann,<sup>a</sup> the fin rays have been incorrectly enumerated, and should stand: Dorsal 100, anal 76.

*Measurements in hundredths of length, without caudal.*

Length of head .....	25
Diameter of eye .....	4
Interorbital width .....	4.5
Length of snout .....	6
Length of maxillary .....	11.5
Width of head .....	12.5
Greatest depth, at front of dorsal .....	20
Depth at base of caudal .....	2.5
Distance from snout to dorsal .....	33
Distance from snout to ventrals .....	19
Distance from snout to anal .....	50
Length of ventrals .....	14
Length of pectorals .....	16

<sup>a</sup> Fishes of North America, Pt. 3, p. 2502.

The last anal ray is partly united with the basal portion of the caudal in this young northern specimen—a character we can not verify in southern adults. The species has 7 branchiostegals and the lateral line is evident, forming a strong arch anteriorly above the pectorals.

LYCODES BREVIPES Bean.

A single specimen, 192 mm. long, was taken by Professor Kineaid in East Sound, Puget Sound. The species has been known previously only from Alaskan waters. The fin rays have been incorrectly enumerated in this species. Counting to the middle of the tail, we find in four specimens, including the Puget Sound example, the dorsal contains 98 to 102 rays and the anal 82 to 89. The differences between *L. brevipes* and *L. paleotis* are small in amount, but seem to be constant. The suggestion having been made that they were due to sex, we have examined that matter in 9 specimens of *L. brevipes*, with the result that 5 were found to be females and 4 males. We give below measurements of the Puget Sound specimen in hundredths of the total length:

Length of head.....	22
Length of snout.....	7.5
Diameter of eye.....	5
Length of maxillary.....	9
Distance to front of dorsal.....	29.5
Distance to vent.....	43
Depth of body.....	12
Length of pectoral.....	12
Length of ventral.....	2

LYCONNECTES ALEUTENSIS Gilbert.

*Lyconnectes aleutensis* GILBERT, Rept. U. S. Fish Comr. for 1893 (1896), p. 452, pl. XXXIV.

Two fine specimens, 205 and 238 mm. long, were taken at Brinnon, Hood's Canal, Puget Sound. The species has been known hitherto only from the type specimen, taken by the U. S. Bureau of Fisheries steamer *Albatross* in 1890, north of Unalaska Island, at a depth of 45 fathoms.

In the specimens before us, the dorsal contains 67 spines, the anal 46 and 49 rays, the pectorals 13 rays, the caudal 17 and 18 rays. The first two anal rays are spine-like, being simple, stiff, and pungent, but they are distinctly articulated. The remaining anal rays are all soft, and are once cleft near their tips, the branches thus formed being closely joined throughout except in the posterior rays, where they diverge.

The eyes completely fill the sockets, their sunken condition in the type having been obviously the result of the strong spirits employed in its preservation. There is a deep circular pit, with diameter about



equaling the diameter of the pupil, on the median line of the snout immediately behind the tips of the short premaxillary spines. There are but three strong conical teeth on the head of the vomer in one specimen, four in the other; the palatines are toothless. The smaller specimen contains two slender filaments on the margin of the interopercle, and one at the lower edge of the cheek. These are not evident on the larger example.

The lateral line could not be distinguished in the type, doubtless owing to the shriveled condition of the skin. It consists of a series of small distant papillæ, each perforated with a central pore. They are irregularly spaced, long and short intervals frequently alternating, giving thus the appearance of a paired arrangement. Six or seven of them form a crowded series on the basal fourth of the caudal fin.

*Measurements in hundredths of length, without caudal.*

Length of head.....	16	15.5
Greatest depth.....	7.5	8
Length of snout.....	3.5	4
Diameter of eye.....	1	1
Interorbital width.....	3	2.5
Length of maxillary.....	5	5.5
Width of head.....	8	8.5
Distance from snout to dorsal.....	16	16
Distance from snout to anal.....	44	45
Length of pectoral.....	3.5	4
Length of caudal.....	9.5	9.5